MILITARY
SPECIFICATION

MIL-M-11193D(SigC)
31 July 1960
Superseding
MIL-M-11193C(SigC)
26 November 1958

MICROPHONE, CARBON
(MICROPHONES M-29( )/U and M-52( )/U)

1. SCOPE

1.1 This specification covers two types of hand-held, noise-cancelling microphones with an impedance of 40 to 100 ohms, designated as Microphone M-29( )/U and Microphone M-52( )/U. (See 6.3)

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids, form a part of this specification to the extent specified herein.

SPECIFICATIONS

FEDERAL

T-T-871	Twine, Cotton, Wrapping.
UU-T-111	Tape, Paper Gummed (Sealing and Securing).
LLL-F-291	Fiberboard, Corrugated, Single Face (Flexible).
PPP-B-585	Boxes, Wood, Wirebound.
PPP-B-591	Boxes, Fiberboard, Wood-Cleated.
PPP-B-601	Boxes, Wood, Cleated Plywood.
PPP-B-621	Boxes, Wood, Nailed and Lock-Corner.
PPP-B-636	Boxes, Fiber.
PPP-T-76	Tape, Pressure-Sensitive Adhesive, Paper, Water Resistant.

MILITARY

MIL-P-116	Preservation, Methods of.
MIL-M-5794	Microphone Unit M-6A/UR and Microphone, carbon M-51/UR (carbon, noise-cancelling)

STANDARDS

MILITARY

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes.
MIL-STD-129	Marking for Shipment and Storage.
MIL-STD-169	Extreme Temperature Cycle.

FSC 5965

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MIL-STD-170	Moisture Resistance Test Cycle for Ground Signal Equipment.
MIL-STD-252	Wired Equipment, Classification of Visual and Mechanical Defects.

DRAWING

SC-C-33073	Form to be Used for Pilot Pack Process Sheet.
SC-DL-76334	Microphone M-52( )/U.
SC-DL-85584	Microphone M-29( )/U.

(Copies of specifications, standards, drawings, and publications required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer. Both the title and number or symbol should be stipulated when requesting copies.)

2.2 Other publications.- The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids shall apply.

AMERICAN TRUCKING ASSOCIATION, INC.

National Motor Freight Classification

(Application for copies should be addressed to the National Classification, Board, 1424 16th Street, N.W. Washington 6, D.C.)

CONSOLIDATED CLASSIFICATION COMMITTEE

Uniform Freight Classification
Consolidated Freight Classification

(Application for copies should be addressed to the Consolidated Classification Committee, 202 Union Station, Chicago 6, Illinois).

3. REQUIREMENTS

3.1 Description.-

3.1.1 Microphone M-29( )/U and Microphone M-52( )/U are hand held noise cancelling type microphones for general purpose use. Microphone M-29( )/U is equipped with a five conductor retractile type cord terminated in ten pin connector. Microphone M-52( )/U is equipped with a three conductor, nonretractile type cord terminated in a telephone type plug.

3.2 Construction.-

a. Microphone M-29( )/U.- Construction of Microphone M-29( )/U shall be in accordance with Drawing and Data List SC-DL-85584.

b. Microphone M-52( )/U.- Construction of Microphone M-52( )/U shall be in accordance with Drawing and Data List SC-DL-76334.

3.3 Switch.- The switch shall be capable of operation for a minimum of 500,000 cycles in accordance with 4.7.4 and exhibit a contact pressure of not less than 25 grams in accordance with 4.7.6 when the switch is closed.

3.4 Cleaning.- Metal parts, after fabrication, shall be cleaned in accordance with good commercial practice. Cleaning processes shall have no deleterious effect on the equipment. Corrosive material shall be removed completely before parts are assembled into the microphone. After assembly, units shall be cleaned thoroughly and shall be free from foreign material.

3.5 Dielectric strength and insulation resistance.- The microphone, with Microphone, Carbon M-51( )/UR removed and the switch in the non-operate position, shall withstand without breakdown, a d.c. potential of 500 volts and shall show an insulation resistance of not less than 50 megohms. (See 4.6)

3.6 Operation.- When tested in accordance with 4.7.3, operation of the microphone and switch shall be indicated by the reproduction of audible speech through the test amplifier and loudspeaker. Proper activation of the switch circuit shall be indicated by the continuity check specified in 4.7.3.

3.7 Service conditions.- The microphones shall meet the requirements of this specification after subjection to the following conditions:

3.7.1 Temperature.-

(a) Operating: Ambient temperature in the range of +150°F to -40°F. (See 4.7.1)

(b) Nonoperating: Exposure in the range of +160°F to -80°F. (See 4.7.1)

3.7.2 Relative humidity, nonoperating.- 90 to 98 percent. (See 4.7.2)

3.7.3 Immersion, nonoperating.- Three feet of water for 2 hours. (See 4.7.5)

3.7.4 Elevation: Up to 10,000 feet above sea level. (See Specification MIL-M-5794)

3.8 Preproduction samples.- The contractor shall furnish six (6) preproduction samples for approval, if required by the invitation for bids and contract. After approval, one sample will be used exclusively for the interchangeability test in paragraph 4.8. This sample shall be kept intact for this purpose.

3.9 Interchangeability.- Like units, and replaceable parts shall be physically and functionally interchangeable, without modification of such items or of the microphone. Individual items shall not be hand-picked for fit or performance. (See 4.8)

3.10 Workmanship.- All electrical connections shall be tight, taper pins shall be thoroughly seated. Terminal screws shall be tight. Studs on the switch handle and on the connector shall be properly seated and tight. The switch shall operate freely and positively. The switch cover shall be properly clamped to insure a moisture proof seal. There shall be no abrasions or cuts on the cover. Microphone, Carbon M-51( )/UR shall be firmly seated in the mounting clip. All screws, nuts and other fasteners shall be free of burrs. The mounting hook shall be solidly mounted in the microphone body. Nomenclature marking shall be clear and distinct. Wiring identification shall be in accordance with the drawings. Cover, Microphone CW-292( )/U shall fit the microphone unit firmly and the window portion when mounted shall be limp.

4. QUALITY ASSURANCE PROVISIONS

4.1 Inspection, responsibility and classification of.-

4.1.1 Contractor's responsibility.- The supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own or any other inspection facilities and services acceptable to the Government. Inspection records of the examination and tests shall be kept complete and available to the Government as specified in the contract. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

4.1.2 Items described by subordinate documents.- The contractor shall insure compliance with all requirements contained in all specifications and drawings subordinate to this specification. The Government inspector shall ascertain that, prior to assembly, all such items have been inspected, tested, and accepted in accordance with their respective specifications and drawings.

4.1.3 Classification of inspection.- Inspection shall be classified as follows:

(a) Preproduction inspection (does not include preparation for delivery).

(b) Acceptance inspection. (Acceptance inspection shall be the inspection performed by the contractor and by the Government, as specified by 4.3 and 4.9).

1) Acceptance inspection of items before preparation for delivery. (See 4.3)

(2) Acceptance inspection of preparation for delivery.(See 4.9 and Section 5).

4.2. Preproduction inspection.- This inspection will be performed by the Government unless otherwise specified in the contract. It shall consist of the preproduction inspection specified in Table I and group A, and group C inspection specified in tables II and III, respectively. Additional tests on preproduction samples may be performed to determine compliance with specified requirements.

Table I - Preproduction Inspection

Inspection (For additional preproduction inspection, see 4.2)	Req. Para.	Insp. Para.
Temperature	3.7.1	4.7.1
Humidity	3.7.2	4.7.2
Detailed examination	3.2	4.5

4.3. Acceptance inspection of equipment before preparation for delivery.- The contractor, to demonstrate compliance with specified requirements, shall perform the inspection specified in 4.3.1 through 4.3.3. This does not relieve the contractor of his responsibility for performing any additional inspection which is necessary to control the quality of the product and to assure compliance with all specification requirements. The Government will review and evaluate the contractor's inspection procedures and examine the contractor's inspection records. In addition the Government-- at its discretion -- may perform all or any part of the specified inspection, to verify the contractor's compliance with specified requirements. (See 6.5.) Test equipment for Government verification inspection shall be made available by the contractor.

4.3.1 Group A inspection.- This inspection including sampling shall conform to Table II and the ordinary inspection procedures of Standard MIL-STD-105. Group A inspection shall be performed in any order which is satisfactory to the Government, except that the operational inspection (4.7.3) shall be last.

Table II - Group A inspection

Inspection	Req Para.	Insp Para.	AQL Major	AQL Minor
Visual and mechanical	3.10	4.4	1.0%	4.0%
Performance				
Switch contact pressure	3.3	4.7.6	1.0% for the group combined	*
Dielectric strength and insulation resistance	3.5	4.6		*
Operation	3.6	4.7.3		*

* All electrical and operational defects are of major category.

4.3.2 Group C inspection.- This inspection shall be as listed in table III. Samples shall be selected from those which have passed Group A inspection.

4.3.2.1 Sampling for group C inspection.- One microphone out of each 1000 or fraction thereof shall be selected at random for each test listed in Table III.

4.3.2.2 Noncompliance.- If a sample unit fails group C inspection, the contractor shall immediately investigate the cause of failure and shall report to the Government inspector the results thereof and details of the corrective action taken on the process and all units of product which were manufactured with the same conditions, materials, processes, etc. If the Government inspector does not consider that the corrective action will enable the product to meet specified requirements, or if the contractor cannot determine the cause of failure, the matter shall be referred to the contracting officer. (See 6.4)

Table III - Group C inspection

Inspection	Req Para.	Insp. Para.
Switch Life	3.3.	4.7.4
Immersion	3.7.3	4.7.5
Interchangeability	3.9	4.8

4.3.3 Reinspection of conforming group C sample units.- Unless otherwise specified, sample units which have been subjected to and passed group C inspection, may be accepted on contract, provided that switches which have been life tested are replaced and the units are reworked and pass group A inspection.

4.4 Visual and mechanical inspection.- The microphone shall be examined for compliance with the workmanship requirements of paragraph 3.10. Classification of workmanship defects covered by MIL-STD-252 shall be in accordance with that standard. All other workmanship defects shall be classified as major.

4.5 Detailed examination.-

(a) Every part of Microphone M-29( )/U shall be examined and measured for compliance with the drawings and specifications on Drawing and Data List SC-DL-85584. (See 3.2)

(b) Every part of Microphone M-52( )/U shall be examined and measured for compliance with the drawings and specifications on Drawing and Data List SC-DL-76334. (See 3.2).

4.6 Dielectric strength and insulation resistance.- A potential of 500 volts a.c. shall be applied for not less than 2 seconds between each conductor and the remaining conductors connected together and to the exposed metal parts. Immediately after the dielectric-strength test, the insulation resistance shall be measured with a galvanometer or other approved instrument, using a d.c. potential of 500 volts, applied for not less than 2 seconds between each conductor and the remaining conductors connected together and to the exposed metal parts. (See 3.5)

4.7 Service conditions and operational tests.-

4.7.1 Temperature.- The microphone shall be subjected to the temperature cycle shown on MIL-STD-169. Operation test shall be made at step 3 (150°F), step 5 (77°F) step 8 (-40°F) and step 10 (77°F). (See 3.6 and 3.7.1)

4.7.2 Humidity test.- Subject the microphone to continuous cycling for a total of five 48 hour cycles. Each cycle shall conform to MIL-STD-170. No repair or replacement of parts shall be made. Afterwards there shall be no corrosion of metal parts or binding of moving parts and the microphone shall meet the operation test of paragraph 4.7.3 (See 3.7.2)

4.7.3 Operation.- The microphone shall be connected to an amplifier and loudspeaker capable of indicating operation of the microphone when spoken into. A test circuit shall be provided indicating continuity of the switch, cord, and connector or plug when the switch is activated. (See 3.6)

4.7.4 Switch life test.- The switch shall be tested by operating it for 500,000 make and break cycles at a rate of not less than 25 cycles per minute. The switch contacts shall open and close a one ampere current at 24 volts through a resistance load. Electrical counters shall be placed in each switch circuit and a mechanical counter on the mechanism for operating the switch. At the completion of 500,000 operational cycles the difference in reading between either electrical counter and the mechanical counter shall not exceed 1000 operations. (See 3.3))

4.7.5 Immersion test.- The microphone shall be immersed to a minimum depth of 3 feet of fresh water (65 to 80°F) for 2 hours. After immersion, the microphone shall be removed from the water, wiped dry on exterior surfaces, and the switch cavity opened; leakage constitues failure. (See 3.7.3)

4.7.6 Switch contact pressure.- With the switch closed by depressing the activating bar, a minimum force of 25 grams shall be required, using a spring gage, to separate each pair of switch contacts. This test may be made on completed switches before they are installed in the microphones.

4.8 Inspection for interchangeability.- Each replaceable part listed below in the selected microphone shall be interchanged with the corresponding part in the approved preproduction sample in sequential order. At the completion of this inspection, the interchanged parts shall be reassembled in their original microphones. Noninterchangeability of these parts constitute failure.

Switch
Boot
Retainer plate
Cable relief spring, retaining bushing, and cord
Microphone mounting clip
Mounting screws

4.9 Acceptance inspection of preparation for delivery.-The contractor, to demonstrate compliance with specified requirements, shall perform the inspection specified by 4.9.1 and 4.9.2. This does not relieve the contractor of his responsibility for performing any additional inspection which is necessary to control the quality of the product and to assure compliance with all specification requirements. The Government will review and evaluate the contractor's inspection procedures and examine the contractor's inspection records. In addition the Government -- at its discretion -- may perform all or any part of the specified inspection, to verify the contractor's compliance with specified requirements. (See 6.5).

4.9.1 Preservation and packaging.- Inspection of preservation and packaging shall be as specified in Specification MIL-P-116. Classification of defects shall be as shown on Table IV.

TABLE IV

PRESERVATION, AND PACKAGING AND MARKING THEREOF

Major	Minor
1. Use of improper or defective material.	1. Item not properly blocked or braced within the unit package to prevent movement.
2. Quantity in unit package not as specified.	2. Packaging material damaged.
3. Incorrect packaging method applied.	3. Conforming wraps are not snug-fitting and contain voids.
4. Cushioning or padding omitted.	4. Any item of marking information other than 6 thru 8 omitted, incorrect, or illegible.
5. Cushioning inadequate for the physical and mechanical protection of the item.	
6. Stock number omitted, incorrect, or illegible.	
7. Nomenclature omitted, incorrect, or illegible.	
8. Marking of quantity of items in package omitted, incorrect or illegible.	

4.9.2 Packing and marking of exterior containers.- Packing and marking exterior containers shall be given visual inspection for the defects listed below and to determine conformance with the approved process sheet furnished by the contractor as required by the contract. This inspection shall conform to the Appendix to Standard MIL-STD-105. Inspection level L-8 shall be used for normal inspection and L-6 for reduced inspection. Unless otherwise specified herein, normal inspection shall be used at the start of the contract. The reduced inspection procedure shall be R-1. The AQL for major defects shall be four percent and the AQL for minor defects shall be ten percent. Classification of defects shall be as shown on Table V.

TABLE V

PACKING, AND MARKING THEREOF

Major	Minor
1. Use of improper or defective material.	1. Unsealed carton.
2. Quantity in pack not as specified.	2. Defective taping or sealing of carton.
3. Box closure not as specified.	

TABLE V

PACKING, AND MARKING THEREOF (CONTD)

Major	Minor
4. Type, grade, class, and style of the shipping container not as specified.	3. Any other box defect which may be considered minor by definition of Standard MIL-STD-105.
5. Strapping omitted.	4. Any item of required marking information other than 9 thru 15 listed under major defects omitted, incorrect, or illegible.
6. Strapping inadequate or incorrectly applied.	
7. Items not adequately blocked, braced, or cushioned within the shipping container to prevent movement or damage.	
8. Shipping documents or packing list omitted.	
9. Stock number omitted, incorrect, or illegible.	
10. Nomenclature omitted, incorrect, or illegible.	
11. Marking of quantity of items in pack omitted, incorrect, or illegible.	
12. Destination marking omitted, incorrect, or illegible.	
13. Service designation (color marking) omitted.	
14. Specified special marking and labeling such as MAP labels, shipment digit markings, etc., omitted, incorrect, or illegible.	
15. Overseas code marking omitted, incorrect, or illegible.	

4.9.2.1 Inspection lot.- A lot for visual inspection of the pack shall be all completed packs which are identical and will be submitted for acceptance at one time.

4.9.2.2 Procedure in case of failure.- If an inspection lot fails, the contractor shall immediately investigate the cause of failure and shall report to the Government inspector the results thereof and details of the corrective action taken. If the contractor and Government inspector cannot agree on the effectiveness of the corrective action, the matter shall be referred to the contracting officer for resolution.

4.9.2.3 Disposition of nonconforming product.- Disposition of nonconforming product (sample units and inspection lots) shall be in accordance with the requirements of Standard MIL-STD-105 for disposition of rejected product. When submitted for acceptance, such product shall be suitably tagged or identified by equivalent means to indicate the cause of failure and means employed to correct the fault. The required information shall be presented to the Government when the product is submitted and shall become the property of the Government.

4.9.2.4 Rough handling test (preparation for delivery).- When rough handling test is required by the contract (see 6.2(1)e, the following functional test shall be conducted to determine freedom from operational malfunction caused by the rough handling:

Para. 4.7.3 - Operation.-

5. PREPARATION FOR DELIVERY.

5.1 Preservation and packaging.-

5.1.1 Level A.- Microphone, Carbon (Microphones M-29( )/U and M-52( )/U) shall be preserved, packaged and tested in accordance with the procedures specified for the designated methods as prescribed in Specification MIL-P-116 and described in the following paragraphs:

5.1.1.1 Microphone M-29( )/U and M-52( )/U with Cover CW-292( )/U.- Each Microphone M-29( )/U with Cover or M-52( )/U with cover shall be packaged Method IC-5 as follows: Position cover over microphone. Wind the power cord of each microphone into a coil of proportionate dimensions and tie at three places with cotton twine, Type II, 6 Ply, conforming to Specification T-T-871. Cushion each microphone by wrapping in flexible, single face, corrugated fiberboard, Type III, conforming to Specification LLL-F-291. Secure cushioning with gummed paper tape, Class 3, conforming to Specification UU-T-111. Place each cushioned microphone within a close-fitting, fiberboard box, Type I, Class 2, Grade 5, Style RSC, conforming to Specification PPP-B-636. Box closure shall be sealed with tape, conforming to Specification PPP-T-76. Three full length strips shall be applied to both top and bottom, and one strip over manufacturer's joints so that all seams are covered. Each strip shall extend, at least 3 inches, on the opposite panel.

5.1.2 Level C.- MIcrophone M-29( )/U and M-52( )/U shall be packaged in accordance with commercial practice and in a manner that will afford protection against corrosion, deterioration and physical damage, during direct shipment to the first receiving activity.

5.2 Packing.-

5.2.1 Level A.- Fifty (50) each Microphones M-29( )/U or M-52( )/U shall be packed within a wirebound wood box, wood-cleated fiberboard box, wood-cleated plywood box, or a nailed wood box conforming to the requirements of Specification PPP-B-585, Class 3, PPP-B-591 (Overseas Type), PPP-B-601 (Overseas Type), PPP-B-621, Class 2, respectively. Box closure and strapping shall be as specified in the applicable box specification or appendix thereto.

5.2.2 Level B.- Fifty (50) each Microphone M-29( )/U or M-52( )/U shall be packed within a wirebound wood box, wood-cleated fiberboard box, wood-cleated plywood box, or a nailed wood box, conforming to the requirements of Specification PPP-B-585 (Class I), PPP-B-591, (Domestic Type), PPP-B-601 (Domestic Type), PPP-B-621 (Class I), respectively. Box closure shall be as specified in the applicable box specification or appendix thereto.

5.2.3 Level C.- Microphone M-29( )/U or M-52( )/U shall be packed as specified in 5.2.2, except that the shipping container shall comply with the Uniform Freight Classification Rules or Regulation of other carries as applicable to the mode of transportation.

5.3 Marking.- Interior & [illegible] for shipping containers shall be marked in accordance with [illegible] provisions of Standard MIL-STD-129.

5.4 Packaging tests.- Packages prepared as specified in 5.1.1 shall be required to pass the tests in Section 4.

5.5 Pilot pack.- Unless otherwise specified in the invitation for bid or contract, a pilot pack shall be furnished for Government inspection and approval. A pilot pack shall consist of all preservation, packaging, packing and marking for delivery for the complete equipment on contract or order. A Pilot Pack Process Sheet using the format shown on Drawing SC-C-33073 shall be prepared by the Contractor and forwarded to the Contracting Officer and shall be accompanied by such drawings, sketches, and other data as may be necessary to completely describe the procedure followed in fabricating the pilot pack and to identify the equipment items therein.

6. NOTES

6.1 Intended use.- Microphones M-29( )/U and M-52( )/U are intended for general purpose use.

6.2 Ordering data.- Procurement documents should specify the following:

(a) Title, number, and date of this specification and any amendment thereto.

(b) Type required.

(c) Number of preproduction samples required.

(d) Level of packaging and level of packing required for shipment. (Level A, level B, and level C).

(e) The specific paragraphs of section 5 which are applicable to the particular procurement.

(f) Preproduction inspection:

(1) Preproduction pack(s) as follows:

a. Makeup of pack(s).
b. Number of each kind of pack to be submitted.
c. Inspection to be performed thereon--including rough handling test, which will not be performed as procurement inspection.
d. Five copies of process sheet, using format shown on Drawing SC-C-33073 and accompanied by such drawings, sketches, and other data as may be necessary to completely describe the procedure followed in fabrication of the preproduction pack(s) and to identify the items therein. These data should be submitted to the contracting officer with the preproduction pack.
e. A packaging technician from the procuring agency will evaluate the preproduction pack(s).

(g) Marking and shipping of samples.

(h) Place of final inspection.

6.3 Nomenclature.- The parentheses in the nomenclature will be deleted or replaced by a letter identifying the particular design; for example; M-29W/U. The contractor should apply for nomenclature in accordance with the applicable clause in the contract. (See 1.1)

6.4 Group C inspection.- Approval to ship may be withheld, at the discretion of the Government, pending the decision from the contracting officer on the adequacy of corrective action. (See 4.3.2.2)

6.5 Verification inspection.- The amount of verification inspection (by the Government) will be adjusted to make maximum utilization of the contractor's quality control system and the quality history of the product, and will normally be identified by the categories listed below:

(a) Type A--The total of that inspection set forth in the Quality Assurance Provisions of this specification or the contract. Included in this category is that amount of inspection referred to as normal and tightened inspection by Military Standard 105.

(b) Type B--That inspection set forth in the Quality Assurance Provisions of this specification or the contract reduced in amount under the reduced inspection provisions of Military Standard 105.

(c) Type C-- A reduced inspection procedure resulting in a material reduction in the amount of inspection set forth in the Quality Assurance Provisions of this specification. The amount of inspection is less than that provided for in type B and is based upon a consistently acceptable product resulting from a planned quality control system voluntarily employed by the contractor in the production of the product.